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ABSTRACT

This booklet, one of a series developed by the Frederick County Board of Education, Frederick, Maryland, provides an instruction module for an individualized or flexible approach to secondary science teaching. Subjects and activities in this series of booklets are designed to supplement a basic curriculum or to form a total curriculum, and relate to practical process oriented science instruction rather than theory or module building. Included in each booklet is a student section with an introduction, performance objectives, and science activities which can be performed individually or as a class, and a teacher section containing notes on the science activities, resource lists, and references. This booklet introduces the student to the interpretation and use of topographic maps. The estimated time for completing the activities in this module is two weeks. (SL)

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ED130895

Topographic

AIDS TO INDIVIDUALIZE THE TEACHING OF SCIENCE

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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MINI-COURSE UNITS

BOARD OF EDUCATION OF FREDERICK COUNTY
1974

Marvin G. Spencer

SE 021 637

GRAPHIC ARTS DEPARTMENT - F.C.B.

TOPOGRAPHIC MAPS

Prepared by

John Geist

John Fradiska

Estimated Time for Completion

2 weeks

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Mini Courses for

Physical Science, Biology, Science Survey,

Chemistry and Physics

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1974

FOREWORD

The writing of these instructional units represents Phase II of our science curriculum mini-course development. In Phase I, modules were written that involved the junior high disciplines, life, earth and physical science. Phase II involves senior high physical science, biology, chemistry, physics and science survey.

The rationale used in the selection of topics was to identify instructional areas somewhat difficult to teach and where limited resources exist. Efforts were made by the writers of the mini-courses to relate their subject to the practical, real world rather than deal primarily in theory and model building.

It is anticipated that a teacher could use these modules as a supplement to a basic curriculum that has already been outlined, or they could almost be used to make up a total curriculum for the entire year in a couple of disciplines. It is expected that the approach used by teachers will vary from school to school. Some may wish to use them to individualize instruction, while others may prefer to use an even-front approach.

Primarily, I hope these courses will help facilitate more process (hands on) oriented science instruction. Science teachers have at their disposal many "props" in the form of equipment and materials to help them make their instructional program real and interesting. You would be remiss not to take advantage of these aids.

It probably should be noted that one of our courses formerly called senior high physical science, has been changed to science survey. The intent being to broaden the content base and use a multi-discipline approach that involves the life, earth and physical sciences. It is recommended that relevant topics be identified within this broad domain that will result in a meaningful, high interest course for the non-academic student.

ALFRED THACKSTON, JR.
Assistant Superintendent for Instruction

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b. Point of Rocks, Maryland
c. Harpers Ferry, West Virginia 15

Analyze topographic maps showing different geological features, such as:

a. Karst topography
b. mountain and valley regions
c. alluvial fan
d. canyon region
e. glacial regions
f. leeves and flood plains 23

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TOPOGRAPHIC MAPS

There are maps which can tell you how far towns are apart. Most of you have seen these kind of maps. Have you ever looked at the road maps and wondered what the land was like? For instance, did you want to know how high a mountain was, or how deep a canyon or valley was? Geologists have special maps which you will use in this unit to answer these questions and others like them. These maps are called topographic maps. They show us the shape of the land - which is called the topography.

OBJECTIVE

Students will be able to:

1. gain a background for further topographic map study.

ACTIVITY

a. Complete Worksheet #1. This will be turned in and graded. Use one of the following books or some other earth science text.

(1) Earth Science - The World We Live In, 3rd edition, by Namowitz and Stone, Chapter 6

or

(2) Pathways in Science I, The Earth We Live On by Oxenhorn and Idelson, Chapters 10-11

Worksheet #1

Topographic Maps

1. What is topography?
2. What is another name for topographic sheets (maps)?
3. How do topographic maps show elevation?
4. Contour lines show places of equal _____.
5. What is contour interval?
6. What is relief?
7. What is an index contour?
8. How can you tell the elevation of a place on a contour line?
9. How can you tell the elevation of a place not on a contour line?
10. What does BM stand for and mean?
11. What do contour lines widely spaced signify (or mean)?
12. What do contour lines closely spaced signify?
13. What do V-shaped contours signify?
14. What do closed (looped) contours signify?
15. What does a depression contour signify?
16. What does black stand for on a topographic map?
17. What does blue stand for on a topographic map?
18. What does brown stand for on a topographic map?
19. What does blue-green (green) stand for on a topographic map?
20. What are some uses for topographic maps?

OBJECTIVE

Students will be able to:

2. identify and use basic information found on topographic maps.

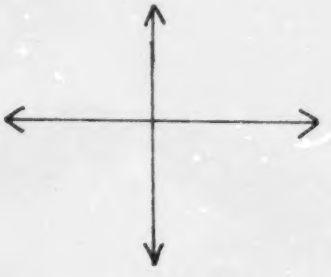
ACTIVITY

a. Complete Worksheet #2. This will be discussed in class and turned in and checked. Use any earth science textbook to complete this assignment.

Worksheet #2

0	7½ minutes	Bench mark	15 minutes
Latitude	Contour Interval	Map	90°
Longitude	Numeric	Magnetic declination	Graphic
Verbal	Contour	Contour depression	Degree
Parallel	Meridian	Scale	

1. _____ Lines that run north and south
2. _____ Lines that run east and west
3. _____ The latitude of the equator
4. _____ Longitude of the Greenwich Meridian
5. _____ The three types of scales
6. _____
7. _____
8. _____ A line of equal elevation
9. _____ The difference in the elevation of two contour lines
10. _____ Points of exact elevation
11. _____ The two main types of topographic maps are
12. _____
13. _____ The variation in degrees from true north and the compass north
14. _____ Used to show a depression
15. _____ The representation of the earth
16. _____ Distance north and south of the equator
17. _____ Units for measuring angular distance on a map
18. _____ Distance east and west of prime meridian
19. _____ The distance on a map equal to a distance of land
20. Label: North, South, East, and West



OBJECTIVE

Students will be able to:

3. construct contour lines and understand how they are made.

ACTIVITY

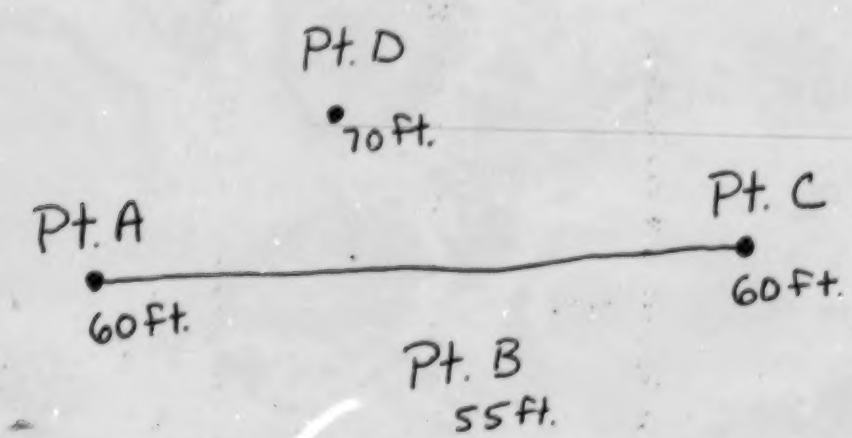
a. Complete Worksheet #3, Contour Line Construction.

Worksheet #3

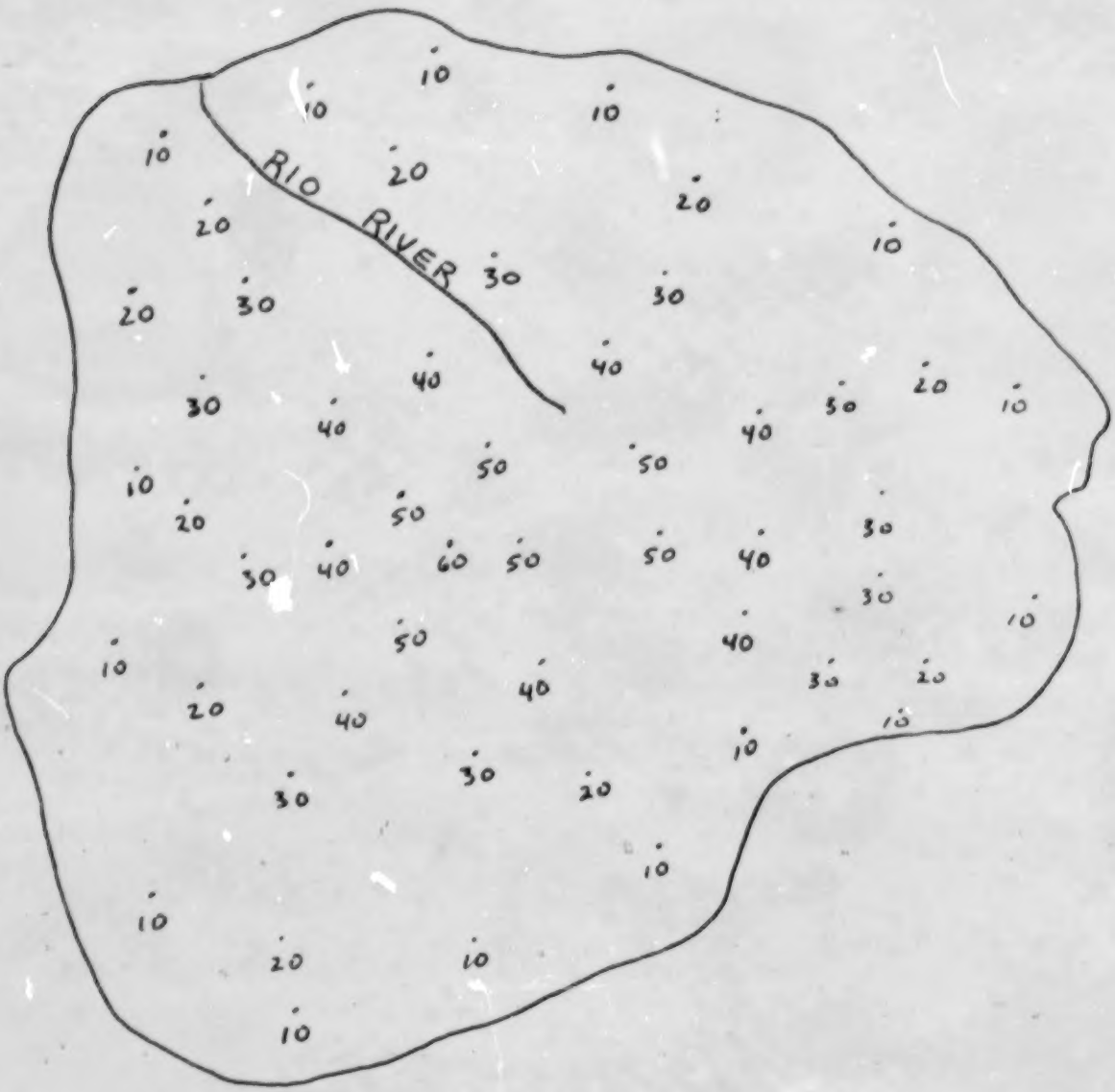
Contour Line Construction

Draw in the Contours

Instructions: You will find a group of numbers representing elevations for a given area. You will construct contour lines - which are as you know lines which connect points of equal height. To illustrate: point "A" elevation is 60 feet and point "C" elevation is 60 feet. They can be connected via a straight line now called a contour line (see illustration below). It is important to keep all points of equal elevations connected and when points show an elevation which is not the height of the contour line, you have to decide which side of the line it goes on. For example, point B height of 55 feet would go on the lower decreasing side of the 60 ft. contour line. (See illustration and note D's elevation.)



Now carefully study the elevation listed on the next page and construct contour lines for this area. Use 10 ft. as a contour interval. Use pencil as you may have to erase.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OBJECTIVE

Students will be able to:

4. construct a profile given data from a topographic map.

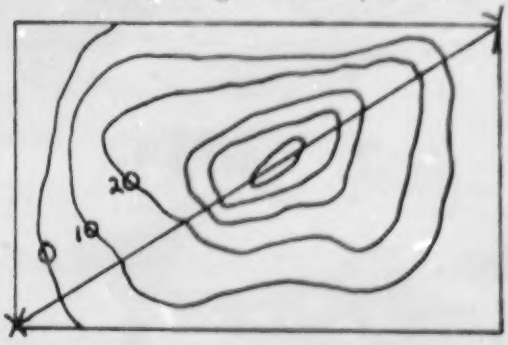
ACTIVITY

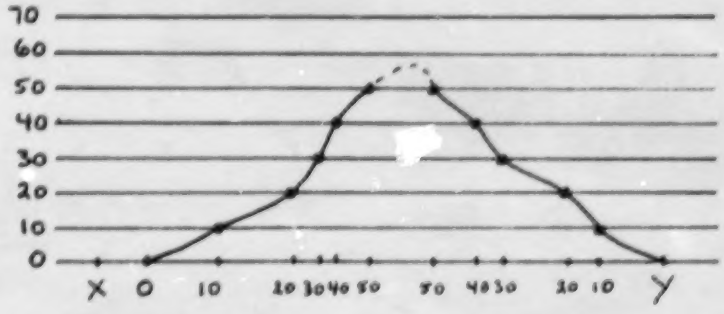
a. Complete Worksheet #4, Constructing Profiles from Contour Maps.

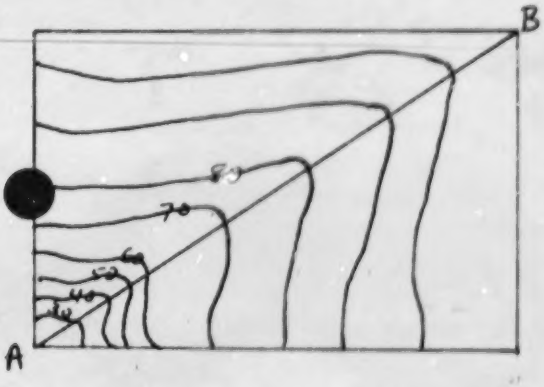
Worksheet #4

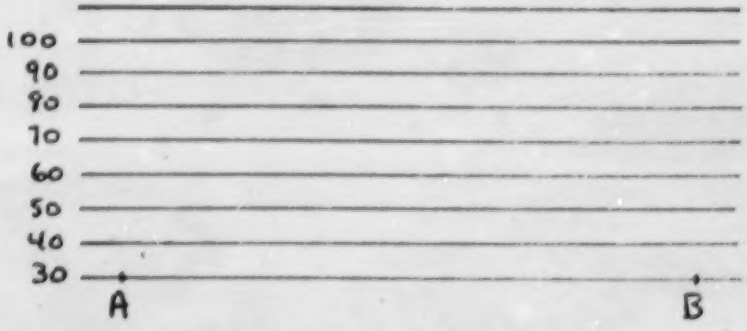
Constructing Profiles from Contour Maps

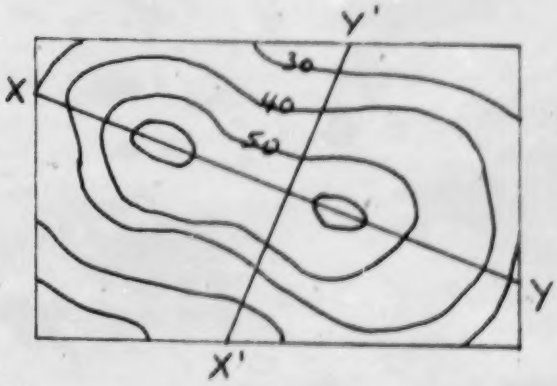
Instructions: Use a scratch sheet of paper and lay it on the path X - Y and others. Mark off exactly where the contour lines intersect the path. Label these marks the elevations of the contour lines. Transfer this data to the scale at the right and efficiently plot the data and construct a profile by connecting all the points.

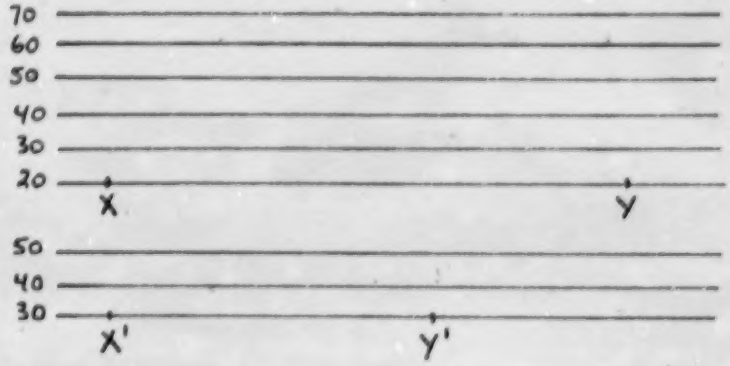


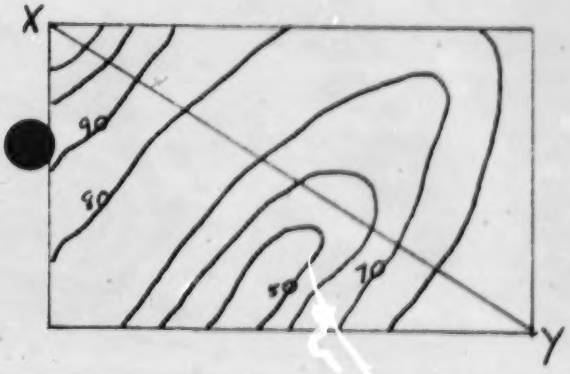












OBJECTIVE

Students will be able to:

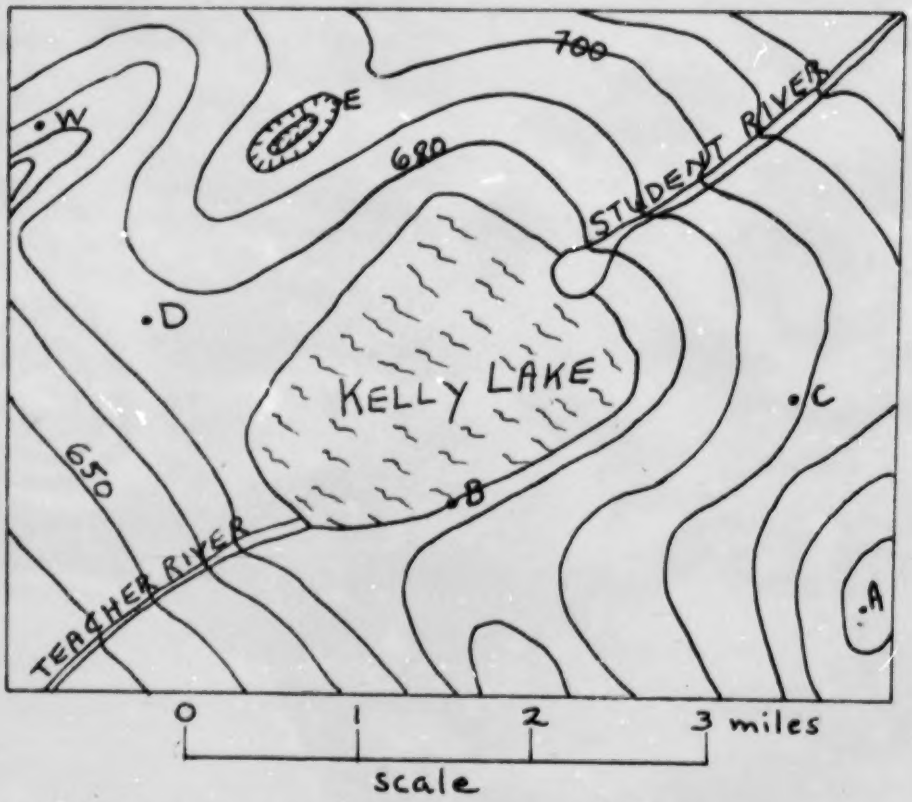
5. become familiar with topographic ma[illegible]analysis.

ACTIVITY

a. Complete Worksheet #5, Kelly Lake Sample Contour Map.

Worksheet #5

Kelly Lake Sample Contour Map



Instructions: Use the map above to answer these questions.

1. What contour interval was selected for this map?
2. How many square miles are represented by this map?
3. Which is the correct scale for this map?
4. What is the elevation of Kelly Lake?
5. What is the elevation of point D?
6. What is the maximum elevation of point A?
7. What is the elevation of point C?
8. Is Teacher River an inlet or outlet of Kelly Lake?
9. How can you tell this?
10. What is the slope per mile of Student River?
11. What is the elevation of the shore of Kelly Lake?
12. Determine the distance between points A and E.
13. What is the elevation of the depression at point E?
14. Approximately what area is occupied by Kelly Lake?
15. Where would be a good place to build a cabin near Kelly Lake? Why? (think of floods)

OBJECTIVE

Students will be able to:

6. construct a topographic map with contour lines.

ACTIVITIES

a. Complete Lab Sheet #1, Topographic Map of a Model Mountain.

b. Complete Lab Sheet #2, Topographic Map of a Model Mountain Alternative.

Lab Sheet #1

Topographic Map of a Model Mountain

Materials: transparent shoe box and lid, mountain model, grease pencil or marking pencil, plastic sheet, tape, H_2O. (ESCP contour model kit)

Procedure:

1. Make a series of marks up a side of the box exactly ½" apart (1 mm).
2. Place the mountain model inside the box and tape it firmly to the bottom of the box.
3. Now pour water into the box -- up to (not over) your first mark.
4. With a marking pencil, draw a line on the mountain model at the water line (where the water and land meet).
5. Now repeat procedure 3 and then 4 until the mountain is entirely covered by water.
6. Put the lid on the box, place the plastic sheet on the lid and trace the lines (on the plastic) as you see above the shoe box.
7. When finished, carefully remove all H_2O and dry the materials.
8. Use your topographic map and do the general problems below:

   a. Name your map.
   b. Determine a contour interval.
   c. Explain what contour lines are.
   d. How high is the peak of your mountain?
   e. Label directions - which side of your mountain is steeper? How can you tell?
   f. What does a contour map show?

Readers Note:

9. If you do not use H_2O, the paper with the concentric lines will provide several relief forms and won't be as messy.

Lab Sheet #2

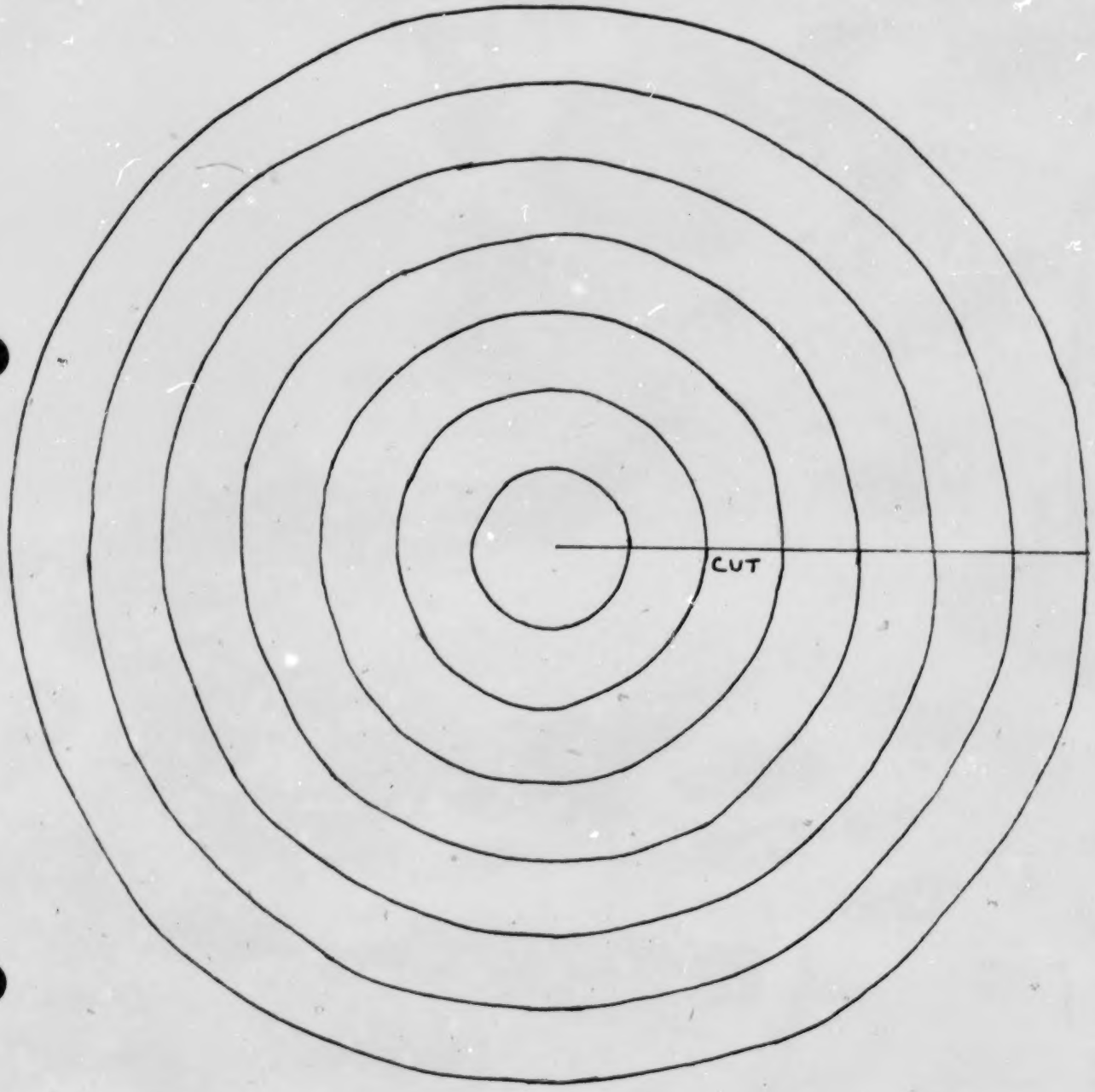
Topographic Map of a Model Mountain Alternative

Materials: Same as Lab Sheet #1 except no water will be used and the paper contour model will be used. See paper contour model below.

Procedure:

1. The procedure will be the same as Lab Sheet #1 except no water will be used and in place of the real model, a paper contour model will be used.

2. Cut out the outside line, cut into center, and tape to a desired height.



OBJECTIVE

Students will be able to:

7. analyze topographic maps showing the terrain of local areas, such as:

    a. Frederick, Maryland
    b. Point of Rocks, Maryland
    c. Harpers Ferry, West Virginia

ACTIVITIES

a. Complete the Lab Sheet #3, Frederick Map Analysis.

b. Complete Lab Sheet #4, Point of Rocks Map Analysis.

c. Complete Lab Sheet #5, Point of Rocks Map Analysis.

d. Complete Lab Sheet #6, Harpers Ferry Map Analysis.

Lab Sheet #3

Frederick Map Analysis

Answer the following questions on a separate sheet of paper.

1. Name of the map?
2. Scale?
3. Contour Interval?
4. During what year was the map made?
5. Who made the map?
6. Who published the map?
7. When were the aerial photos of this area taken?
8. When was the culture of this map revised?
9. What is the magnetic declination?
10. Who does the red tint on the map mean?
11. What does the green tint on the map mean?
12. How many feet are in each inch on this map?
13. What does the land look like when the contour lines are close together?
14. What does the land look like when the contour lines are far apart?
15. What are the topographic symbols for:

    a. cemetery
    b. school
    c. unimproved road
    d. railroad
    e. bench mark
    f. church
    g. depression
    h. bridge
    i. index contour
    j. contour line

16. What is the elevation of:

    a. Ridge Hill
    b. Jigger Hill
    c. High Knob
    d. Rocky Spring Cemetery
    e. Frederick High School
    f. Municipal Airport
    g. Bootjack Spring
    h. T.V. Relay Towers
    i. Indian Spring Church
    j. Filtration Plant

17. What is the highest elevation on this map?

18. What is the lowest elevation on this map?

19. Which end of Grove Quarry is steeper?

20. How far in miles is Middletown from the edge of the map on Alternate Route 40?

21. How many churches are in Frederick City?

22. How far is it in miles from:

    a. Parkway School to Lincoln School
    b. Frederick to Thurmont on Route #15
    c. County Hospital to Frederick High School

23. How large is Culler Lake?

24. In what direction are these places from Frederick City:

    a. Feagaville
    b. Braddock Drive-In
    c. Municipal Airport
    d. Rocky Spring Cemetery
    e. Thurmont

25. Name five creeks and/or rivers that are on this map.

26. State the names of the bordering quadrangles (8 of them).

27. In what direction does Carroll Creek flow? How can you tell?

28. What is the shortest distance to Hagerstown from Frederick? Is it on Alternate Route 40 or Route 40? How much shorter?

Lab Sheet #4

Point of Rocks Map Analysis

Instructions: Obtain a Point of Rocks topographic map and use it to answer the following questions.

1. What is the name of the map?
2. What is the series (type) of this map?
3. What is the latitude and longitude range of this map?
4. Name the eight (8) surrounding quadrangles.
5. State the scale of the map as a fraction and as miles per inch, and ft. per inch.
6. What is the contour interval of this map?
7. When was this map made? How old is it?
8. What is the area shown by this map?
9. What are the major towns shown on this map?
10. Name 4 smaller towns shown on this map.
11. What is the major stream shown?
12. What is the main tributary to this stream?
13. Name 3 minor streams.
14. What is the major geologic feature shown on this map?
15. Name 3 islands.
16. What direction is Frederick from Point of Rocks?
17. How far is Brunswick from Point of Rocks?
18. Give the dimensions of Heaters Island. (L x W x H)
19. How far is Leesburg from the southern edge of the map?
20. How much of the Potomac River is shown?
21. What is the highest elevation shown?
22. Locate a depression.

23. Which is higher, Brunswick or Point of Rocks School?

24. Determine the gradient of Catoctin Creek (N).

25. Determine the gradient of Catoctin Creek (S).

26. Determine the approximate latitude and longitude of Point of Rocks.

27. Determine the approximate latitude and longitude of Brunswick.

28. Which island shows a habitat?

29. What direction does Route 340 run?

Determine the elevation for the following places:

30. St. Paul's Church

31. Pine Rock

32. Taylors

33. Bethel Church

34. Lewis Mill

35. Catoctin Station

36. Lock No. 28

37. Swimming pool in Brunswick

38. Bells Mill

39. St. Mark's Church

40. Lat. = 39 22 30" Long. = 77 32 30"

41. Which side of Catoctin Mountain (N) is steeper?

42. What is the land like between BM 233 and Point of Rocks (words)? How can you tell?

43. Is the southeast section higher or lower than the southwest section?

44. What is the highest elevation along the B & O tracks?

45. Is Route 15 a state or federal road?

46. What is the elevation of the landing field in Brunswick?

47. How much does the Potomac River drop on this map?

48. Where is the levelest part of this map?

49. Why are there a lot of railroad tracks in that particular location in Brunswick?

50. Find the treasure: Begin at Lat. = 39 16 30", Long. = 77 32 30", travel NE about 1 mile, turn NW and in that direction 314 miles; now travel NE about 3 miles and then go west about 4 miles; turn S (SE) and travel to a green treasure which is (AN) _____.

Lab Sheet #5

Point of Rocks Map Analysis

1. Determine the length of the Potomac River as shown on this map.
2. What is the length of Heaters Island?
3. What is the scale of this map?
4. Determine the contour interval for this map.
5. Name 6 symbols used on this map.
6. What is the elevation of Brunswick High School?
7. What is the elevation of Pine Rock at the top of Catoctin Mountain?
8. Determine the elevation of the church in Jefferson, Maryland.
9. Determine the total length of Route 340.
10. Determine the gradient (slope) of the Potomac River from the Landing Field at Brunswick, Maryland, to the bridge that crosses the river at Point of Rocks.
11. What is the elevation at the top of Furnace Mountain in Virginia?
12. Determine the elevation of the school in Jefferson, Maryland.
13. How many churches are located in Point of Rocks?
14. What is the elevation of Lock No. 28 along the Chesapeake and Ohio Canal?

Lab Sheet #6

Harpers Ferry Map Analysis

1. How far is it from the highway bridge at Brunswick to the power plant at Harpers Ferry?
2. What is the contour interval for this map?
3. What is the scale of this map?
4. What is the highest elevation given on this map?
5. How much of the Potomac River is shown on this map?
6. How much of the Shenandoah River is shown on this map?
7. What is the elevation of the Radio Tower on Short Hill Mountain in Virginia?
8. How much of Route 671 is shown on this map?
9. What is the gradient (slope) from the Radio Facilities on Short Hill Mountain, Virginia, to the Bench Mark 572 along Route 671.
10. What is the lowest elevation on this map?
11. List and explain 5 symbols used on this map.
12. Determine the elevation at the top of Elk Ridge.
13. How many houses are located in Sandy Hook?
14. In what direction is Brunswick from Harpers Ferry?

OBJECTIVE

Students will be able to:

8. analyze topographic maps showing different geological features such as:

   a. Karst topography
   b. mountain and valley regions
   c. alluvial fan
   d. canyon region
   e. glacial regions
   f. leeves and flood plains

ACTIVITIES

a. Complete Lab Sheet #7, Mammoth Cave, Kentucky Map Analysis.

b. 1. Complete Lab Sheet #8, Harrisburg, Pennsylvania Map Analysis.

   2. Complete Lab Sheet #9, Charleston Map Analysis.

   3. Complete Lab Sheet #10, Mt. Shasta Map Analysis.

c. Complete Lab Sheet #11, Ennis Map Analysis.

d. Complete Lab Sheet #12, Soda Canyon Map Analysis.

e. 1. Complete Lab Sheet #13, White Water Map Analysis.

   2. Complete Lab Sheet #14, Chief Mountain Map Analysis.

f. Complete Lab Sheet #15, Donaldsonville Map Analysis.

Lab Sheet #7

Mammoth Cave, Kentucky Map Analysis

Answer these questions on your paper.

1. Name of Map?

2. Scale of Map?

3. Contour interval?

4. Magnetic Declination?

5. When was the area surveyed?

6. What does the green tint on the map mean?

7. What are the topographic symbols for

   a. Perennial streams
   b. Intermittent streams
   c. Disappearing stream
   d. Depression contours
   e. Railroad
   f. Open pit or quarry
   g. Tunnel entrance
   h. County line

8. Give the directions and locate these places from Park City.

   a. Mammoth Cave
   b. Colossal Cave
   c. Warren Co.
   d. Pig
   e. Little Sinking Creek
   f. Nol in River
   g. Chicken Hollow

9. Find the elevation of

   a. Pilot Knob
   b. Hunts Sink (bottom)
   c. YMCA Camp
   d. Fishtrap Ferry
   e. Double Sink (bottom and top)
   f. The Lake in Woolsey Hollow
   g. Lick Nog School

10. Locate the following (Lat. & Long., Degrees, Sec., Min.)

    a. Onxy Cave
    b. Little Knob
    c. Dry Branch School
    d. Park City
    e. Apple Grove
    f. Rhoda

11. How much of the Green River is shown on the map?

12. Which way does the Green River flow?

13. How can you tell? (elevation)

14. Describe the streams in the southern, central, & northern parts of the map. You may use your text to help you answer the following questions.

15. What type of rock underlies most of the Quadrangle? Why?

16. Is this kind of rock exposed throughout the map area?

17. What does the drainage pattern suggest about the structure of the rock?

18. What type of topography is this? Explain.

19. Compare the size, depth and number of sink holes in the northern and southern parts of the Quad. Explain the differences.

20. Why does Sinking Creek end abruptly near Shively School? In what direction does the water probably drain from this point? Explain.

21. Why are all the caves found in the central part of the Quadrange?

22. Where, within the town limits of Smiths Grove, would the best location for a water well be? (Assuming that the most important consideration is keep the drilling to a minimum.)

23. In which part of the Quad. is the water table the closest to the surface? Furtherest from the surface? Explain.

Lab Sheet #8

Harrisburg, Pennsylvania Map Analysis

Answer these questions.

1. Name of map?

2. Scale of map?

3. Contour interval?

4. Magnetic declination?

5. Who made this map?

6. Who published this map?

7. When (year) were real photos taken?

8. When (year) was the culture revised?

9. Type of map projection?

10. How many inches represent each mile on this map?

11. What does red tint mean?

12. What does green tint mean?

13. What are topographic symbols for

a. church
b. school
c. cemetery
d. contour line
e. heavy-duty road
f. light-duty road
g. state route
h. railroad

14. Give the directions of these places from Harrisburg.

a. Lower Paxton
b. Rutherford Heights
c. Half Falls Mountain
d. West Hanover

15. State elevation (feet) of

a. Harrisburg
b. Camp Shikellimy
c. Ellendale
d. Bressler Island
e. McCormick Island

16. Name ten streams or rivers on this map.

17. State the names of the bordering quadrangles.

1 2 3

8 4

7 6 5

18. How far is it from (miles)

a. Enola to Rutherford Heights
b. Halifax to Linglestown
c. Rockville Bridge to Colonial Park
d. State Capitol to Carsonville

19. How much (miles) of Susquehanna River is shown on this map?

20. How much (miles) of Conodoquinet Creek is shown on this map?

21. Describe the landforms of this area in detail.

22. What does the area look like when the contour lines are far apart?

23. What does the area look like when the contour lines are close together?

24. What landform is shown in Blue Mountain?

25. How far is Gettysburg from Harrisburg?

26. Name a lake and locate it on this map.

27. How far is York from the south end of this map?

28. How many islands are in the Susquehanna River?

29. How many water gaps are in this map?

30. Locate these places as to quadrant number and direction in each quadrant

a. Linglestown
b. Halifax
c. Harrisburg
d. Carsonville

Lab Sheet #9

Charleston Map Analysis

1. Where is Charleston located?
2. What is contour interval of this map?
3. What is the scale?
4. Charleston is situated along which rivers?
5. Name 5 tributaries to each of these rivers?
6. What railroad follows the main river? Why?
7. Why is Charleston stretched out along the river?
8. Name 5 communities similar to Charleston in that they are formed along this major river.
9. What is the significance of the very irregular, wavy contour lines?
10. Name 5 intermittant streams.
11. What is the elevation of:

    a. Charleston
    b. Milliken
    c. Rutledge
    d. Marmet
    e. Mount
    f. Miller School
    g. Etowalt
    h. Villa
    i. Alpha School
    j. Piney Point School

12. What is the approximate length of Charleston?
13. What is the length of the Elk River shown?
14. About how long is the Kanawiia River?
15. Name 5 hollows.
16. Which part of this area is higher than the rest?
17. Which way is the Kanawiia River flowing?
18. How much does this river fall in the length shown on this map?
19. How far is Belle from Charleston?
20. Is Two Mile Creek two miles long?
21. Compare this map and the 3-dimensional map and write a descriptive paragraph about this region.

Lab Sheet #10

Mt. Shasta Map Analysis

1. Where is Shasta located?
2. What is the scale?
3. What is contour interval?
4. Determine the latitude and longitude for this area.
5. What is the dominant or most important feature shown?
6. How can you tell Mt. Shasta is steep?
7. Name 5 glaciers on Mt. Shasta.
8. How do you account for glaciers there and nowhere close on the map?
9. What would be a major occupation of this area?
10. You can tell by the green color most of this area is woodland or forest land. Why don't the trees continue to grow to the top of Mt. Shasta?
11. What is the approximate height of the tree line on Mt. Shasta (where trees cease to grow)?
12. List two other land form structures which resemble Mt. Shasta but are not as high.
13. What is the largest town near Mt. Shasta?
14. List 5 intermittent streams that begin on Mt. Shasta.
15. List 5 permanent streams on the map.
16. Where do you think most of them get their water?
17. What area of this map would be the flatest?
18. What is the elevation of McCloud? (Use BM nearest the name)
19. What is the elevation of:
    a. McKenzie Butte
    b. Shastina
    c. BM peak of Mt. Shasta
    d. Mt. Shasta is about how many miles high
    e. What is the difference in elevation between McCloud and Mt. Shasta?
20. Using the scale, how far across is Mt. Shasta (measure N*S and E*W and use the tree line as boundaries).
21. Observe the 3 dimensional map of this area. Write a descriptive paragraph of this region.

Lab Sheet #11

Ennis Map Analysis

1. Where is this area located?
2. What is the scale of this map?
3. What is the contour interval?
4. Where is Ennis located on the map?
5. What large geologic land form is located to the north of Ennis?
6. What is the unique land form east of Ennis?
7. What mountain is the source for this material?
8. What river system transported most of this material?
9. How many branches are there in the Alluvial Fan?
10. What is the height of Ennis and of the top of Fan Mt.
11. What river flows from Ennis Lake south to Ennis?
12. What is very unusual around this river?
13. Do you think this area could be in danger of flooding? Why?
14. What is very characteristic about the area and slope of alluvial fans? (Hint: Note the index contour lines.)
15. Name 2 scenic mountain areas in this region.
16. How large is the Alluvial Fan? (length)
17. How large is the Ennis River? (L x W)
18. How far is Ennis from Ennis Lake?
19. How far is Ennis from Fan Mountain? (top)
20. What is the elevation of:
    a. Hammond Creek Ranger Station
    b. Race Track (private)
    c. Cherry Creek Ranger Station
    d. Radio tower
    e. Reed Knob
21. What is the difference between Madison River north of Ennis Lake and south of Ennis Lake?
22. Compare this map with the 3 dimensional map and write a descriptive paragraph about it.

Lab Sheet #12

Soda Canyon Map Analysis

1. Where is Soda Canyon located?

2. What is the scale of this map?

3. What is the contour interval?

4. What is the latitude and longitude of this area?

5. What is the famous national park shown?

6. Identify the feature which runs through the middle of each canyon. (Explain why.)

7. Name the river that cuts out the largest canyon.

8. List 5 other smaller rivers or streams which cut out canyons.

9. The land between canyons is usually flat and in geology is called mesas. List 3 mesas.

10. Who were the first people to travel in this area? How can you tell?

11. The southern Indian Reservation is located in which country?

12. What do the canyons in the center west area have in common?

13. T or F. There are many roads in this area. Can you explain why?

14. Which canyon, Salt Canyon or Baker Canyon (in the south) is steeper?

15. Could Red Horse Gulch be considered a small canyon?

16. Why does the Ulte Trail end abruptly at the Manco's River?

17. What is the highest and lowest elevation on Ute Trail?

18. Determine the elevation of the flood of:

    a. Johnson Canyon where it enters Manco's Canyon
    b. Weber Canyon where it enters Manco's Canyon
    c. The highest point on Weber Mountain
    d. The Sun Temple
    e. Cliff dwellings in Johnson Canyon

19. Using the scale, determine the length or distance for:

    a. Johnson Canyon
    b. Manco's Canyon
    c. Salt Canyon to Weber Mountain
    d. The length of Ute Trail
    e. The greatest width of Manco's Canyon

20. What is the largest town shown on this map?

21. Observe the 3-dimensional map of this area, write a descriptive paragraph of the topography for this region.

Lab Sheet #13

White Water Map Analysis

1. Where is White Water located?
2. What is the scale of the map?
3. What is the contour interval?
4. What is the latitude and longitude for this map?
5. Name the largest town shown.
6. What do the dotted contour lines mean?
7. Over all of the map, what does the land look like?
8. You should notice the names of the state parks. What two glacial features are found in this area and in the names of the state parks?
9. Also characteristic of this region is many lakes and marshes. Explain why.
10. How many lakes are shown?
11. Where are the houses located in relation to the lakes? Notice especially the Lauderdale Lakes.
12. What railroad connects White Water and Palmyra?
13. What landform is found mainly near the top of the map but seldom at the bottom?
14. Which area of the map is the highest and which is the lowest?
15. How far is Palmyra from White Water?
16. What is the height of:

    a. Palmyra
    b. Radio Tower south of Palmyra
    c. Round Prairie Cemetery
    d. Little Prairie Cemetery
    e. Zion Cemetery
    f. Pleasant Valley School
    g. School Section Lake
    h. Bird School

17. Name 5 rivers shown on this map.
18. How far is Duck Creek School from South Heart Prairie School?
19. How far is Slabtown from Heart Prairie?
20. Which lake is the largest?

Lab Sheet #14

Chief Mountain Map Analysis

1. Where is Chief Mountain located?
2. What is the scale of this map?
3. What is the contour interval of the map?
4. What is the latitude and longitude of this area?
5. Determine the length of Lake McDonald.
6. What is the highest elevation given on this map?
7. Name the largest glacier given on this map.
8. Many of the valleys on this map are u-shaped. This suggests that these valleys were once occupied by _____.
9. On the map is a black, dashed line labeled CONTINENTAL DIVIDE. Explain the importance of this line.
10. Boulder Creek is located on the _____ side of the Continental Divide.
11. Explain how Pollock Mountain got its name.
12. Determine the total size of the Black Feet Indian Reservation.
13. Name the country that borders the northern part of the map.
14. How did most of the mountains and lakes get their names?
15. List 5 symbols used on this map.
16. What is the height of Almost-a-Dog Mountain?
17. What is the elevation of the land at the edge of St. Mary Lake?
18. Why do you think this map is called Chief Mountain, Montana?
19. In what direction is Going-to-the-Sun Mountain from Gable Mountain?
20. Name the large park represented by the map.

Lab Sheet #15

Donaldsonville Map Analysis

1. Where is Donaldsonville located?
2. What is the scale of this map?
3. What is the contour interval of the map?
4. What is the latitude and longitude of this area?
5. How far is it from Sorrento Oil Field to Grand Point?
6. List 5 uncommon symbols used on this map.
7. Why do you think the Mississippi River bends around Point Houmas instead of going in a straight line?
8. Estimate the percentage of marsh land represented on this map.
9. How many miles of the Mississippi River are on this map?
10. Estimate the length of Blind River.
11. Determine the length of the Illinois Central Railroad.
12. Explain why the contour lines increase in elevation as you move toward the Mississippi River.
13. Which direction does the Mississippi River flow?
14. Locate a pair of Indian mounds on this map.
15. Name 3 canals shown.
16. Name 2 oil fields shown.
17. Name 5 plantations.
18. How wide is the Mississippi River at Stella Landing?
19. How wide is the Mississippi River at St. Clair Landing?
20. How long is the Louisana and Arkansas Railroad?

OBJECTIVES

Students will be able to:

1. gain a background for further topographic map study.
2. identify and use basic information found on topographic maps.
3. construct contour lines and understand how they are made.
4. construct a profile given data from a topographic map.
5. become familiar with topographic map analysis.
6. construct a topographic map with contour lines.
7. analyze topographic maps showing the terrain of local areas, such as:
    a. Frederick, Maryland
    b. Point of Rocks, Maryland
    c. Harpers Ferry, West Virginia
8. analyze topographic maps showing different geological features, such as:
    a. Karst topography
    b. mountain and Valley Regions
    c. alluvial Fan
    d. canyon region
    e. glacial region
    f. leeves and flood plains

This mini-course kit includes topographic maps, handout sheets and a booklet on topographic maps.

INFORMATION ABOUT THE ACTIVITIES.

1. Worksheets #1 and 2 can be adapted for use with any earth science textbook.
2. Worksheet #3 is designed to help students understand contour lines.
3. Worksheet #4 is an exercise to help students understand how the land relates to the topographic map.
4. Worksheet #5 is designed to help students understand the basics of topographic maps.
5. Lab Sheet #1 is designed to give the student practical application by constructing a topographic map of a model mountain. This lab should provide the student with a complete understanding of contour lines and contour interval.

6. Lab Sheet #2 is an alternative to Lab Sheet #1 if you do not wish to use water and keep the mess to a minimum. Lab Sheet #2 could also be used for the students that need more help in understanding the basics of topographic maps.

7. From this point on, you have many options for completing this mini-course. You could do the map labs in order and self pace your students or you could have your students select and complete any ten maps or just complete the maps of the local area.

8. The handout sheet, Topographic Map Symbols, should be given to the students and collected at the end of each class. This handout sheet should be returned with the kit.

9. The booklet, Topographic Maps, can be used in place of the earth science text in many cases. This pamphlet should be returned with the kit.

10. Evaluation - This will consist of grades for each activity.

RESOURCES

Pathways in Science I, The Earth We Live On, by Oxenhorn and Idelson, Globe Book Company, Inc., New York 10010, 1968 edition

Earth Science - The World We Live In, 3rd edition, by Namowitz and Stone, D. Van Nostrand Company, Inc., Princeton, New Jersey, 1965 edition

Evaluation Form for Teachers

Name of mini-course _____

Evaluation Questions	Yes	No	Comments
1. Did this unit accomplish its objectives with your students?			
2. Did you add any of your own activities? If so, please include with the return of this form.			
3. Did you add any films that other teachers would find useful? Please mention source.			
4. Were the student instructions clear?			
5. Was there enough information in the teacher's section?			
6. Do you plan to use this unit again?			

7. Which level of student used this unit? _____

8. How did you use this unit - class, small group, individual? _____

PLEASE RETURN TO SCIENCE SUPERVISOR'S OFFICE AS SOON AS YOU COMPLETE THE COURSE.

SCIENCE MINI-COURSES

PHYSICAL SCIENCE	Prepared by
ELECTRICITY: Part 1 (Types of Generation of Electricity)	Marvin Blickenstaff
ELECTRICITY: Part 2 (The Control and Measurement of Electricity	Marvin Blickenstaff
ELECTRICITY: Part 3 (Applications for Electricity)	Marvin Blickenstaff
CAN YOU HEAR MY VIBES? (A Mini-course on Sound)	Charles Buffington
LENSES AND THEIR USES	Beverly Stonestreet
WHAT IS IT? Identification of an Unknown Chemical Substance	Jane Tritt
BIOLOGY	
A VERY COMPLEX MOLECULE: D.N.A. The Substance that Carries Heredity	Paul Cook
Controlling the CODE OF LIFE	Paul Cook
Paleo Biology – BONES: Clues to Mankind's Past	Janet Owens
A Field Study in HUMAN ECOLOGY	Janet Owens
Basic Principles of GENETICS	Sharon Sheffield
HUMAN GENETICS – Mendel's Laws Applied to You	Sharon Sheffield
SCIENCE SURVEY	
WEATHER Instruments	John Fradiska
TOPOGRAPHIC Maps	John Geist and John Fradiska
CHEMISTRY	
WATER	Ross Foltz
PHYSICS	
PHYSICAL OPTICS	Walt Brilhart